

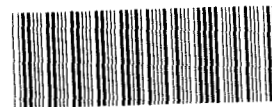


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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION VIII

999 18th STREET - SUITE 500  
DENVER, COLORADO 80202-2466

JAN 11 1994



000059735

Ref: 8HWM-FF

Mr. Martin McBride  
Assistant Manager for Transition  
and Environmental Restoration  
Rocky Flats Office  
U.S. Department of Energy  
P.O. Box 928  
Golden, Colorado 80402-0928

Re: Resumption of Baseline Risk  
Assessment Work

Dear Mr. McBride:

As you know, a specific portion of baseline risk assessment work, data aggregation for the purpose of conducting a human health exposure assessment, is currently under a work stoppage. This letter is to inform you that the Colorado Department of Health (CDH) and the Environmental Protection Agency (EPA) have agreed on the methodology for data aggregation which is described in the enclosed document. We believe that this approach sufficiently meets the requirements of both the Resource Conservation and Recovery Act and the Comprehensive Environmental Response, Compensation, and Liability Act.

We formally request your concurrence on the implementation of the enclosed approach and the resumption of all baseline risk assessment work at operable units 2 through 7 at the Rocky Flats Plant. Please indicate your concurrence by signing the signature line below and returning a copy of the signed letter to EPA and CDH. Work will subsequently resume as of the date of this letter.

The Department of Energy must evaluate the impacts of the work stoppage on the affected operable unit schedules and submit these to EPA and CDH for approval pursuant to Part 42 of the Interagency Agreement. We request that this information be forwarded no later than February 1, 1994. In reaching agreement on these risk assessment issues at Rocky Flats, it became clear to EPA and CDH that immediate development of preliminary remediation goals (PRGs) will aid in the understanding of potential site problems. We therefore request that DOE immediately begin the process of developing PRGs for the Rocky Flats site. As the remedial investigation proceeds by operable unit and information from the baseline risk assessments becomes available, the PRGs may be modified. In addition to the schedule information requested above, we request that DOE submit a schedule for PRG development.

DOCUMENT CLASSIFICATION  
REVIEW WAIVER PER  
CLASSIFICATION OFFICE

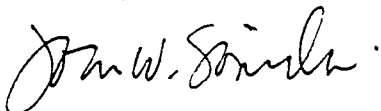


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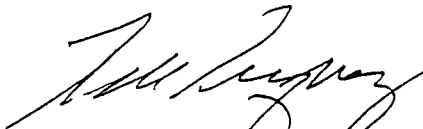
A-0601-000528

If you have any questions regarding the work resumption procedures or the data aggregation approach, please contact Joe Schieffelin of CDH at (303) 692-3356 or Martin Hestmark of EPA at (303) 294-1134.

Sincerely,



Joan Sowinski, Manager  
Hazardous Waste Control Program  
Colorado Department of Health



Robert L. Duprey, Director  
Hazardous Waste Management Division  
Environmental Protection Agency

CONCURRENCE:

Martin McBride  
Assistant Manager for Transition  
and Environmental Restoration  
Rocky Flats Plant  
U.S. Department of Energy

Enclosure

cc: Martin Hestmark, EPA  
Richard Schassburger, DOE  
Joe Schieffelin, CDH  
Bruce Thatcher, DOE

# DATA AGGREGATION FOR HUMAN HEALTH EXPOSURE ASSESSMENT

## BACKGROUND

### Interagency Agreement Provisions

The Rocky Flats Interagency Agreement (IAG) integrates the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), the Resource Conservation and Recovery Act (RCRA), and the Colorado Hazardous Waste Act (CHWA). The IAG specifies that, except as provided for in paragraph 153, EPA will prepare a Record of Decision (ROD) and the Colorado Department of Health (CDH) will prepare a Corrective Action Decision (CAD) for each operable unit (OU).

### Baseline Risk Assessment

The spatial scale of a risk assessment to support a ROD is generally the OU. The spatial scale of a risk assessment to support a RCRA/CHWA CAD is a solid waste management unit (SWMU) or a release from a SWMU. A SWMU is defined as any discernible unit at which solid wastes have been placed at any time, irrespective of whether the unit was intended for the management of solid or hazardous waste.

The individual hazardous substance site (IHSS) as defined in the IAG (i.e., an individual location where hazardous substances have come to be located) represents a close corollary to the SWMU. Therefore, the spatial scale of a risk assessment to support a RCRA/CHWA CAD at Rocky Flats is an IHSS. Note that the distinction between an IHSS and a SWMU is important for radionuclides, because radionuclides are covered under CERCLA but specifically excluded from RCRA/CHWA.

### Definitions

Depending on the spatial and temporal distribution of contaminants, OU's and IHSS's may be divided into "hot spots" and "sources". Hot spots are defined as localized contamination present in concentrations significantly elevated when compared to the surrounding area. "Sources" are defined as areas of sufficiently high levels of contamination to cause considerations of fate and transport to be meaningful. Both primary and secondary sources (i.e., contaminant sinks within environmental media as a result of fate and transport from primary sources) may exist. Depending on the concentration of contaminants, a source will be greater in areal extent than a hot spot.

## ROCKY FLATS-SPECIFIC CONSIDERATIONS

### Selection of COCs

COCs for each OU will be chosen in accordance with the enclosed flowchart. The flowchart illustrates a methodology developed by consensus between the Department of Energy, EPA, and CDH. The entire OU database will be used to make the background comparison; the remaining flowchart steps will be accomplished using the maximum detected concentration for each contaminant. Although the selections of COCs and "special case COCs" proceed along separate paths of the flowchart, the two lists will be combined for the purpose of aggregating data for the exposure assessment.

### Baseline Risk Assessment Framework

In order to conduct a baseline risk assessment which supports both a CERCLA ROD and a RCRA CAD, two separate assessments will be included, as necessary, in Rocky Flats OU RCRA Facility Investigation/Remedial Investigation (RFI/RI) Reports as follows:

- 1) a risk assessment for each source within an OU, and
- 2) a risk assessment for hot spots.

Depending on the distribution of COCs, both risk assessments may or may not be included in each OU RFI/RI report. Each OU RFI/RI Report will be supported by a description of the specific application of this basic framework included in the Exposure Scenarios Technical Memorandum (TM) required by IAG Attachment II.D.1.b. The TM will include maps illustrating the nature and extent of contamination and a delineation of each source and hotspot that will be evaluated.

### Data Aggregation for Human Health Risk Assessment

The objective of data aggregation for the exposure assessment is to determine a concentration of each COC that is representative of the exposure being analyzed. The area of exposure depends upon the population at risk, their activities, and their exposure routes. EPA's Guidance for Data Useability in Risk Assessment (Part A) references the concept of an "exposure unit", the area over which receptors integrate exposure.

Ideally, the exposure unit is defined by the exposure scenario under consideration. However, because of limitations in the existing database and the requirements of both RCRA/CHWA and CERCLA described above, exposure assessments at Rocky Flats will be conducted by "source areas". A workable definition of "source areas" is the delineation of data points for each contaminant of concern (COC) which exceed the background arithmetic mean plus two standard deviations for inorganics, or the detection limit for organics.

Source areas defined in this manner may or may not have any relationship to actual or potential exposure conditions. However, this approach provides a conservative means of data aggregation given the limitations of the existing database.

The areal extent of a source area must be greater than or equal to the smallest exposure unit under consideration in a given OU. The smallest exposure unit for the Rocky Flats site is associated with the residential land use scenario and is defined as a residential lot, the size of which will be determined after considering local zoning requirements. The exposure unit for other exposure scenarios will be defined by consensus among EPA, DOE, and CDH.

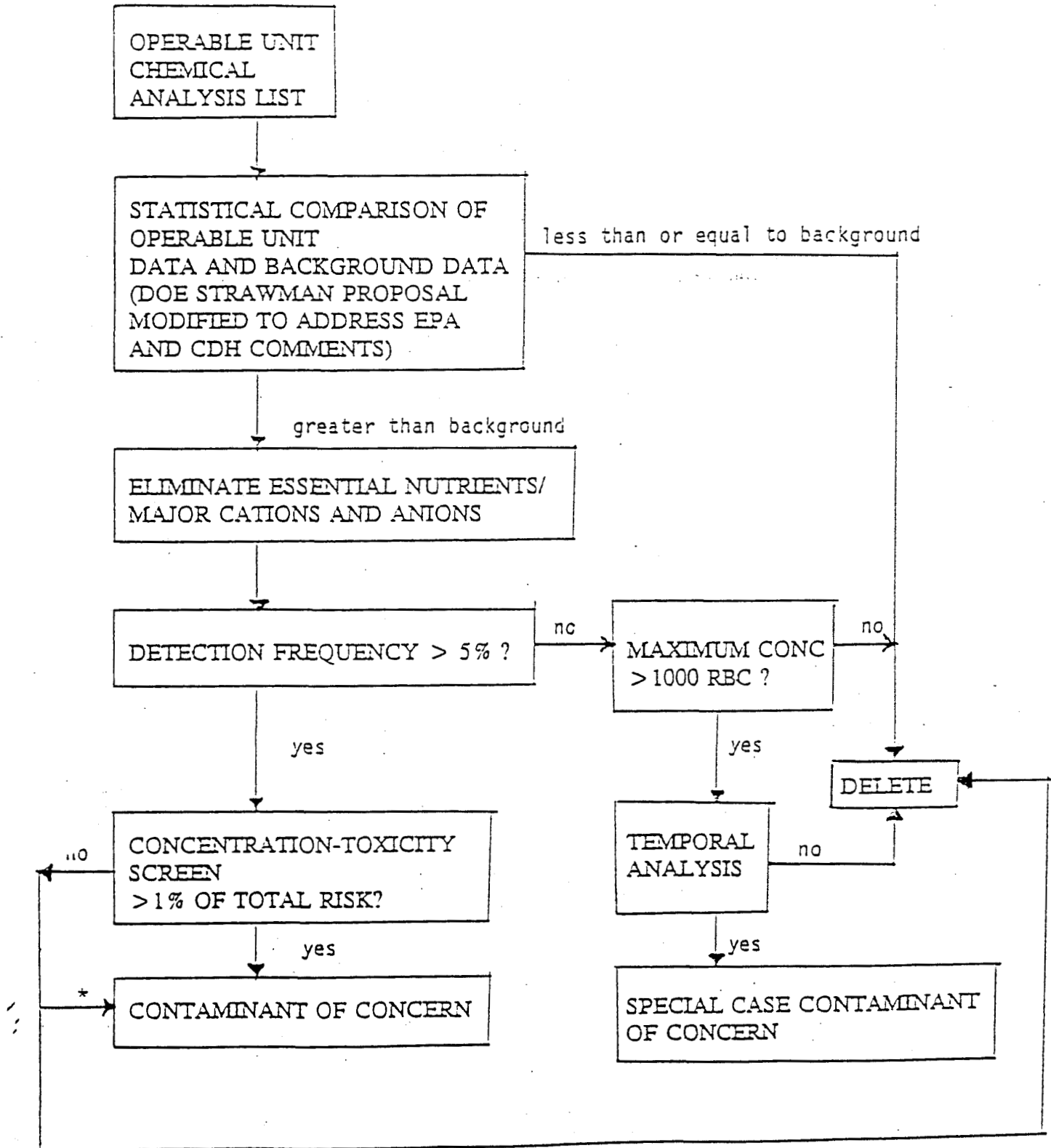
Data aggregation will be accomplished over the source area for each COC by the method described in EPA Publication 9285.7-081, "Supplemental Guidance to RAGS: Calculating the Concentration Term", May, 1992. The 95 % upper confidence limit on the arithmetic mean (95 % UCL) will be used in the risk assessment as an estimate of the exposed individual's long term average exposure. For source areas with limited amounts of data or extreme variability in measured or modeled data, the UCL can be greater than the highest measured or modeled concentration. In these cases, if additional data cannot practically be obtained, the highest measured or modeled value will be used as the concentration term. In addition to the 95 % UCL, DOE may also elect to use geostatistics, or area/volume averaging techniques upon approval from EPA and CDH. For each OU, DOE will describe the method and rationale used for data aggregation as part of the Exposure Scenarios TM required by IAG Attachment II.D.1.b. which is subject to review and approval by CDH and EPA. It is recognized that source areas defined in this manner may result in different areas being delineated for each COC. In these cases, even though the areas and number of data points included may vary by COC, the methodology of calculating a COC-specific exposure concentration will remain consistent. If source areas overlap such that it is plausible that a receptor will be exposed to multiple sources within an exposure period, additivity of risks associated with exposure to the multiple sources will be considered in the baseline risk assessment.

For each COC in a source area, the result of this data aggregation will be used as the concentration term in the exposure assessment to estimate contaminant intake. All complete exposure pathways will be considered. Fate and transport calculations will be conducted as appropriate for all sources since this is the spatial scale where these processes are meaningful. Environmental media which will be included in the source risk assessment are surface soil, vadose zone soil, groundwater, sediments, surface water, and air. Contaminant intake will be used to calculate the source specific risk along with appropriate toxicity information. If the resulting risks calculated within the source area are greater than or equal to  $10^{-4}$ , no further evaluation of "hot spots" is required. If, however, the resulting risks are less than  $10^{-4}$ , a further evaluation of hot spots is required.

## Hot Spots

Within each source area, hot spots will be delineated as those data points exceeding 10 times or 100 times the source area average, as defined above. Again, to meet the objectives of an exposure assessment, this area must be greater than or equal to the smallest exposure unit under consideration in the operable unit. The method of data aggregation will be the same as that described above for the source areas. The resulting hot spot risk assessment must include consideration of all complete exposure pathways, consistent with the risk assessment for the source area except that fate and transport will not be considered. The spatial scale for which fate and transport is meaningful is the source area. At DOE's discretion, for radionuclide contamination, the definition of "hot spots" presented in DOE Order 5400.5, "Radiation Protection of the Public and Environment", Title 10 CFR Part 834 (Proposed Rule for DOE Order 5400.5) and DOE/CH/8901, "A Manual for Implementing Residual Radioactivity Guidelines" may also be applied at Rocky Flats.

# CONTAMINANTS OF CONCERN SELECTION PROCESS



\* professional judgement

ID	Name	Duration	Scheduled Start	Scheduled Finish	1994											
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	HHRA DEVELOPMENT	212d	2/1/94	11/23/94												
2	BACKGROUND COMPARISON	51d	2/1/94	4/12/94												
3	COMPARISON IMPLEMENTATION	21d	2/1/94	3/1/94												
4	EG&GIDOE REVIEW	10d	3/2/94	3/15/94												
5	COMMENT INCORPORATION	10d	3/16/94	3/29/94												
6	EPAICDH REVIEW RESULTS	10d	3/30/94	4/12/94												
7	BACKGROUND RESULT ACCEPTANCE	0d	4/12/94	4/12/94												
8	ORGANICS EVALUATION	42d	2/1/94	3/30/94												
9	NATURE & EXTENT DETERMINATION	42d	2/1/94	3/30/94												
10	COC TECH MEMO	77d	3/2/94	6/16/94												
11	TECH MEMO DEVELOPMENT	21d	3/2/94	3/30/94												
12	DOE/EG&G REVIEW	15d	3/31/94	4/20/94												
13	COMMENT RESPONSE	10d	4/21/94	5/4/94												
14	EPAICDH REVIEW	21d	5/5/94	6/2/94												
15	RESPONSIVENESS SUMMARY	10d	6/3/94	6/16/94												
16	TOXICITY TECH MEMO	77d	3/2/94	6/16/94												
17	TECH MEMO DEVELOPMENT	21d	3/2/94	3/30/94												
18	DOE/EG&G REVIEW	15d	3/31/94	4/20/94												
19	COMMENT RESPONSE	10d	4/21/94	5/4/94												
20	EPAICDH REVIEW	21d	5/5/94	6/2/94												
21	RESPONSIVENESS SUMMARY	10d	6/3/94	6/16/94												
22	EXPOSURE SCENARIO TECH MEMO	77d	3/31/94	7/15/94												
23	DATA AGGREGATION DEVELOPMENT	21d	3/31/94	4/28/94												
24	DOE/EG&G REVIEW	15d	4/29/94	5/19/94												
25	COMMENT RESPONSE	10d	5/20/94	6/2/94												
26	EPAICDH REVIEW	21d	6/3/94	7/1/94												
27	RESPONSIVENESS SUMMARY	10d	7/4/94	7/15/94												

Project HHRA DEVELOPMENT  
Date: 1/24/94

Critical  
Noncritical

Progress  
Milestone

Summary  
Rolled Up



ID	Name	Duration	Scheduled Start	Scheduled Finish	1994											
					Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
28	FATE & TRANSPORT MODELING	61d	7/4/94	9/26/94												
29	CONTAMINANT MODELING	61d	7/4/94	9/26/94												
30	HUMAN HEALTH RISK ASSESSMENT	103d	7/4/94	11/23/94												
31	DATA EVALUATION	61d	7/4/94	9/26/94												
32	EXPOSURE ASSESSMENT	61d	7/4/94	9/26/94												
33	TOXICITY ASSESSMENT	21d	8/29/94	9/26/94												
34	RISK CHARACTERIZATION	21d	9/27/94	10/25/94												
35	EEHHRA INTEGRATION	21d	9/27/94	10/25/94												
36	REPORT PREPARATION	21d	10/26/94	11/23/94												
37	SUBMIT BASELINE RISK ASSESSMENT	0d	11/23/94	11/23/94												
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Project HHRA DEVELOPMENT  
Date 1/24/94

Critical ☐  
Noncritical ☐

Progress ☐  
Milestone ☐

Summary ☐  
Rolled Up ☐

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